FIG.1

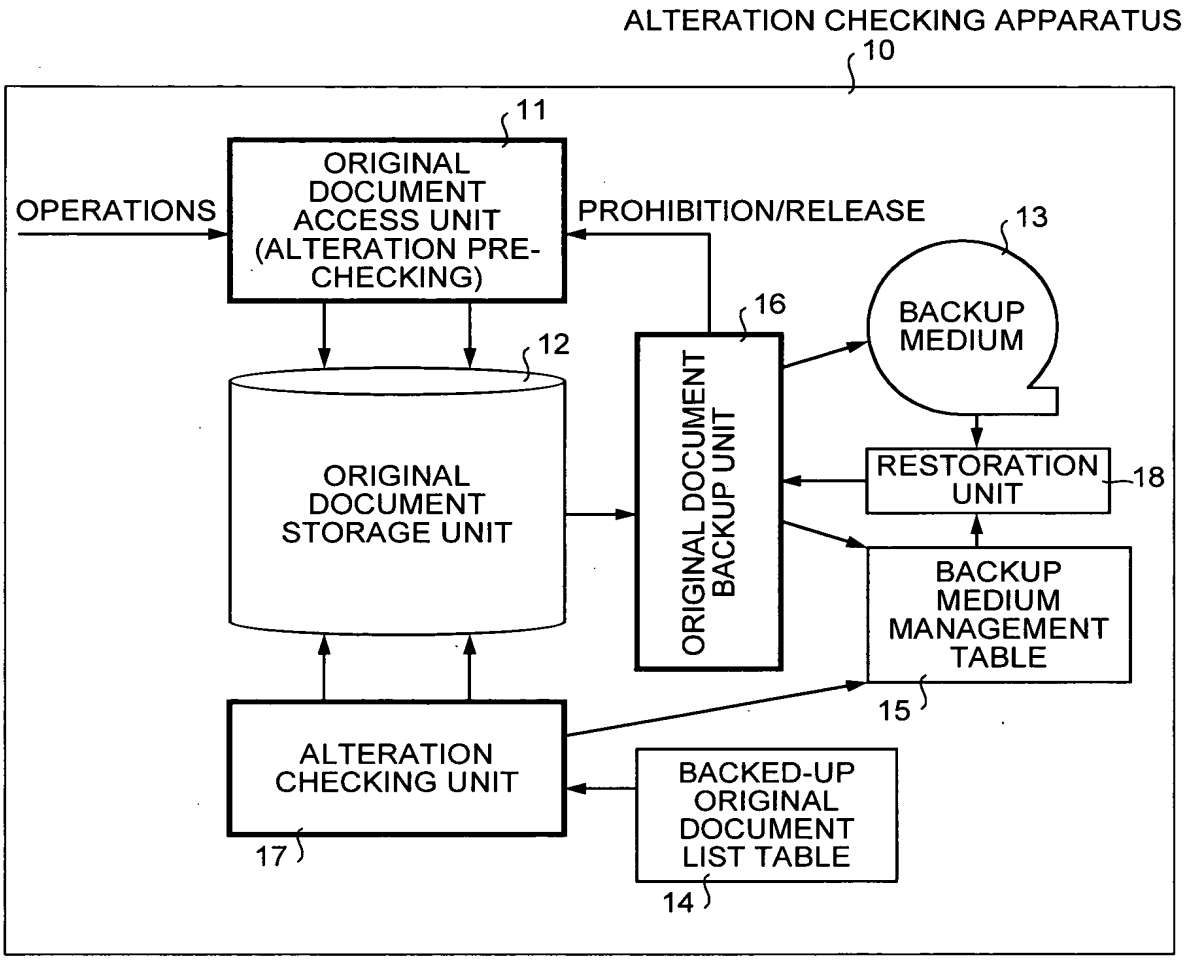

ALTERATION CHECKING APPARATUS
10
11
ORIGINAL DOCUMENT ACCESS UNIT (ALTERATION PRE-CHECKING)
OPERATIONS
PROHIBITION/RELEASE
13
BACKUP MEDIUM
16
12
ORIGINAL DOCUMENT STORAGE UNIT
ORIGINAL DOCUMENT BACKUP UNIT
RESTORATION UNIT
18
BACKUP MEDIUM MANAGEMENT TABLE
15
ALTERATION CHECKING UNIT
17
BACKED-UP ORIGINAL DOCUMENT LIST TABLE
14

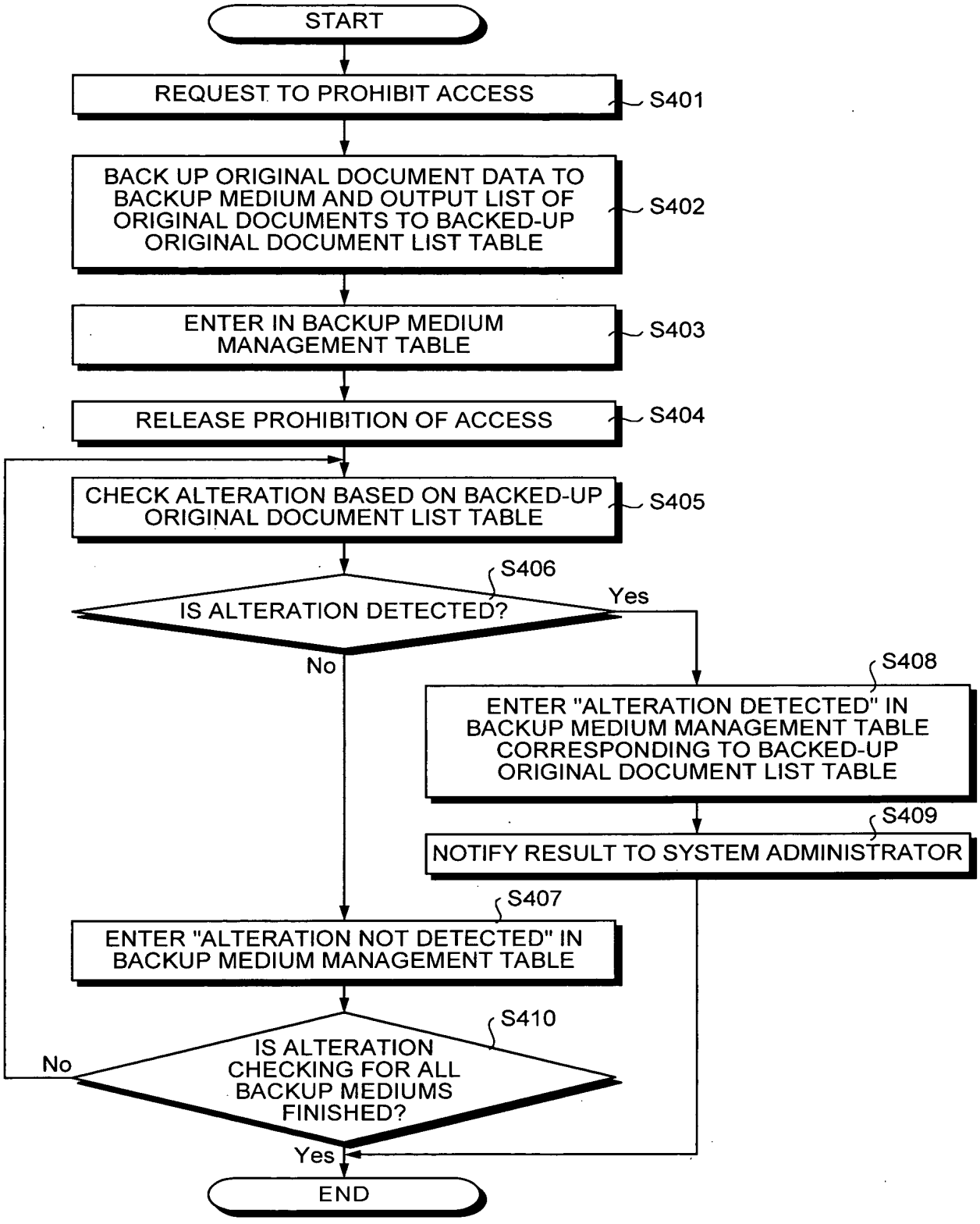
FIG.2

No.	CATEGORY	MEDIUM ID	SERIAL No.	FILE	PASS
45	DAILY	D20030203		DOCUMENT A (ONLY ALTERED PORTION IS SAVED)	x/y/z/a
				DOCUMENT B (ONLY ALTERED PORTION IS SAVED)	x/y/z/b
				DOCUMENT C (ONLY ALTERED PORTION IS SAVED)	x/y/z/c
46	MONTHLY	M200302	1	DOCUMENT A (ALL ENVIRONMENTS ARE SAVED)	x/y/z/a
				DOCUMENT B (ALL ENVIRONMENTS ARE SAVED)	x/y/z/b
				DOCUMENT C (ALL ENVIRONMENTS ARE SAVED)	x/y/z/c
47	MONTHLY	M200302	2	DOCUMENT A (ALL ENVIRONMENTS ARE SAVED)	x/y/z/a
				DOCUMENT B (ALL ENVIRONMENTS ARE SAVED)	x/y/z/b
				DOCUMENT C (ALL ENVIRONMENTS ARE SAVED)	x/y/z/c
48	MONTHLY	M200302	3	DOCUMENT A (ALL ENVIRONMENTS ARE SAVED)	x/y/z/a
				DOCUMENT B (ALL ENVIRONMENTS ARE SAVED)	x/y/z/b
				DOCUMENT C (ALL ENVIRONMENTS ARE SAVED)	x/y/z/c

FIG.3

No.	GENE-RATION	CATE-GORY	MEDIUM ID	SE-RIAL No.	BACKED-UP DATE	ALTERATION CHECKED DATE	ALTERATION CHECKING STATUS
1	PREVIOUS TWO GENERATIONS	DAILY	D20021202		2002.12.02	2002.12.02	CHECKED:OK
2		MONTHLY	M200212	1	2002.12.02	2002.12.04	CHECKED:OK
3		MONTHLY	M200212	2	2002.12.02	2002.12.04	CHECKED:OK
4		MONTHLY	M200212	3	2002.12.02	2002.12.04	CHECKED:OK
5		DAILY	D20021203		2002.12.03	2002.12.03	CHECKED:OK
6		DAILY	D20021204		2002.12.04	2002.12.04	CHECKED:OK
7		DAILY	D20021205		2002.12.05	2002.12.05	CHECKED:OK
⋮		⋮	⋮	⋮	⋮	⋮	⋮
22		DAILY	D20021227		2002.12.27	2002.12.27	CHECKED:OK
23	PREVIOUS GENERATION	DAILY	D20030106		2003.01.06	2003.01.06	CHECKED:OK
24		MONTHLY	M200301	1	2003.01.06	2003.01.08	CHECKED:OK
25		MONTHLY	M200301	2	2003.01.06	2003.01.08	CHECKED:OK
26		MONTHLY	M200301	3	2003.01.06	2003.01.08	CHECKED:OK
27		DAILY	D20030107		2003.01.07	2003.01.07	CHECKED:OK
28		DAILY	D20030108		2003.01.08	2003.01.08	CHECKED:OK
29		DAILY	D20030109		2003.01.09	2003.01.09	CHECKED:OK
⋮		⋮	⋮	⋮	⋮	⋮	⋮
44		DAILY	D20030131		2003.01.31	2003.01.31	CHECKED:OK
45	LATEST	DAILY	D20030203		2003.02.03	2003.01.06	CHECKED:OK
46		MONTHLY	M200302	1	2003.02.03	----	NOT-YET-CHECKED
47		MONTHLY	M200302	2	2003.02.03	----	NOT-YET-CHECKED
48		MONTHLY	M200302	3	2003.02.03	----	NOT-YET-CHECKED
49		DAILY	D20030204		2003.02.04	2003.02.04	CHECKED:OK
50							
51							
52							
53							

FIG.4


START
REQUEST TO PROHIBIT ACCESS
S401
BACK UP ORIGINAL DOCUMENT DATA TO BACKUP MEDIUM AND OUTPUT LIST OF ORIGINAL DOCUMENTS TO BACKED-UP ORIGINAL DOCUMENT LIST TABLE
S402
ENTER IN BACKUP MEDIUM MANAGEMENT TABLE
S403
RELEASE PROHIBITION OF ACCESS
S404
CHECK ALTERATION BASED ON BACKED-UP ORIGINAL DOCUMENT LIST TABLE
S405
S406
IS ALTERATION DETECTED?
Yes
No
S408
ENTER "ALTERATION DETECTED" IN BACKUP MEDIUM MANAGEMENT TABLE CORRESPONDING TO BACKED-UP ORIGINAL DOCUMENT LIST TABLE
S409
NOTIFY RESULT TO SYSTEM ADMINISTRATOR
S407
ENTER "ALTERATION NOT DETECTED" IN BACKUP MEDIUM MANAGEMENT TABLE
S410
IS ALTERATION CHECKING FOR ALL BACKUP MEDIUMS FINISHED?
No
Yes
END

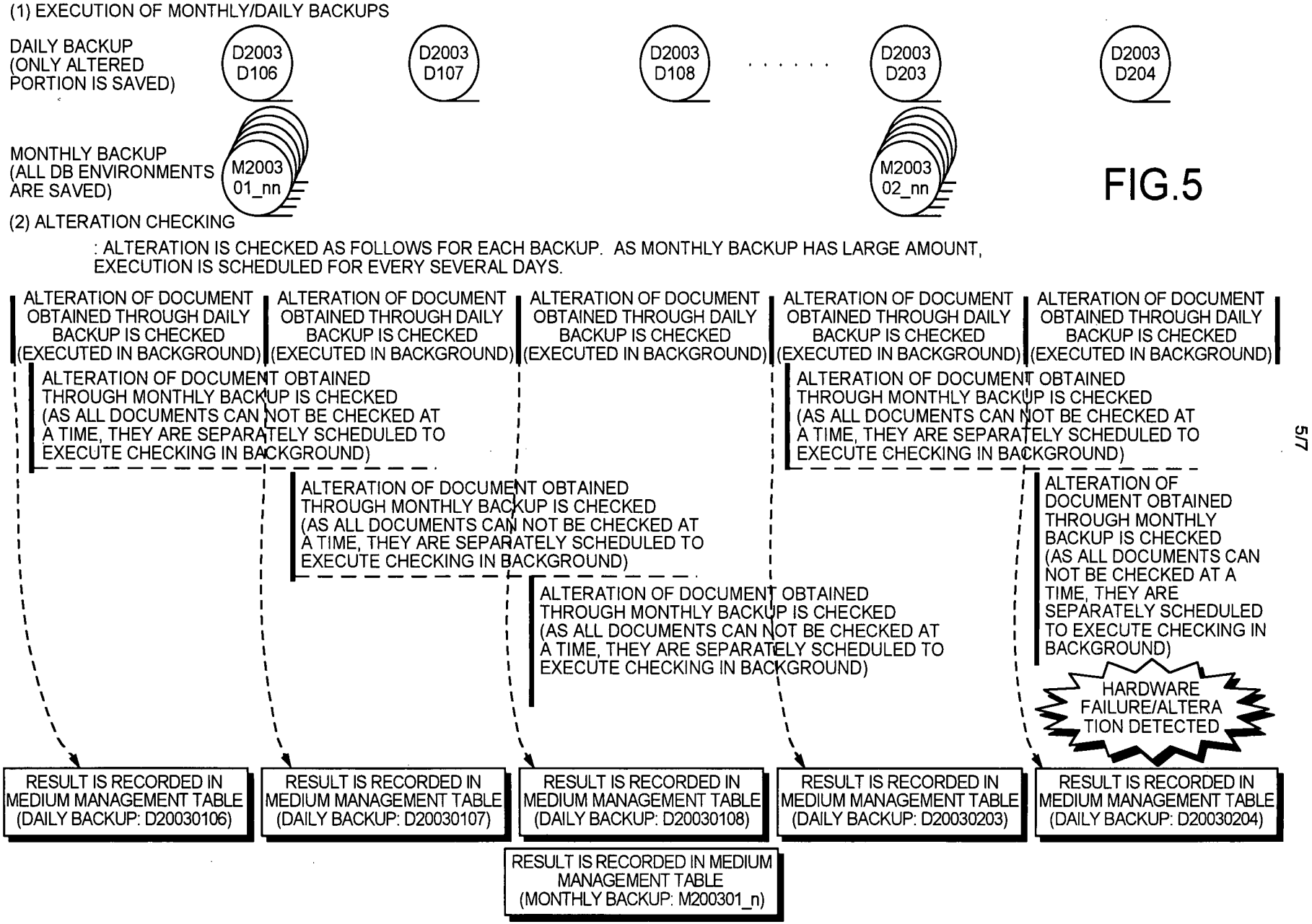

(1) EXECUTION OF MONTHLY/DAILY BACKUPS
DAILY BACKUP (ONLY ALTERED PORTION IS SAVED)
D2003 D106
D2003 D107
D2003 D108
D2003 D203
D2003 D204
MONTHLY BACKUP (ALL DB ENVIRONMENTS ARE SAVED)
M2003 01_nn
M2003 02_nn
(2) ALTERATION CHECKING
: ALTERATION IS CHECKED AS FOLLOWS FOR EACH BACKUP. AS MONTHLY BACKUP HAS LARGE AMOUNT, EXECUTION IS SCHEDULED FOR EVERY SEVERAL DAYS.
ALTERATION OF DOCUMENT OBTAINED THROUGH DAILY BACKUP IS CHECKED (EXECUTED IN BACKGROUND)
ALTERATION OF DOCUMENT OBTAINED THROUGH MONTHLY BACKUP IS CHECKED (AS ALL DOCUMENTS CAN NOT BE CHECKED AT A TIME, THEY ARE SEPARATELY SCHEDULED TO EXECUTE CHECKING IN BACKGROUND)
HARDWARE FAILURE/ALTERATION DETECTED
RESULT IS RECORDED IN MEDIUM MANAGEMENT TABLE (DAILY BACKUP: D20030106)
RESULT IS RECORDED IN MEDIUM MANAGEMENT TABLE (DAILY BACKUP: D20030107)
RESULT IS RECORDED IN MEDIUM MANAGEMENT TABLE (DAILY BACKUP: D20030108)
RESULT IS RECORDED IN MEDIUM MANAGEMENT TABLE (DAILY BACKUP: D20030203)
RESULT IS RECORDED IN MEDIUM MANAGEMENT TABLE (DAILY BACKUP: D20030204)
RESULT IS RECORDED IN MEDIUM MANAGEMENT TABLE (MONTHLY BACKUP: M200301_n)

FIG.5

FIG.6

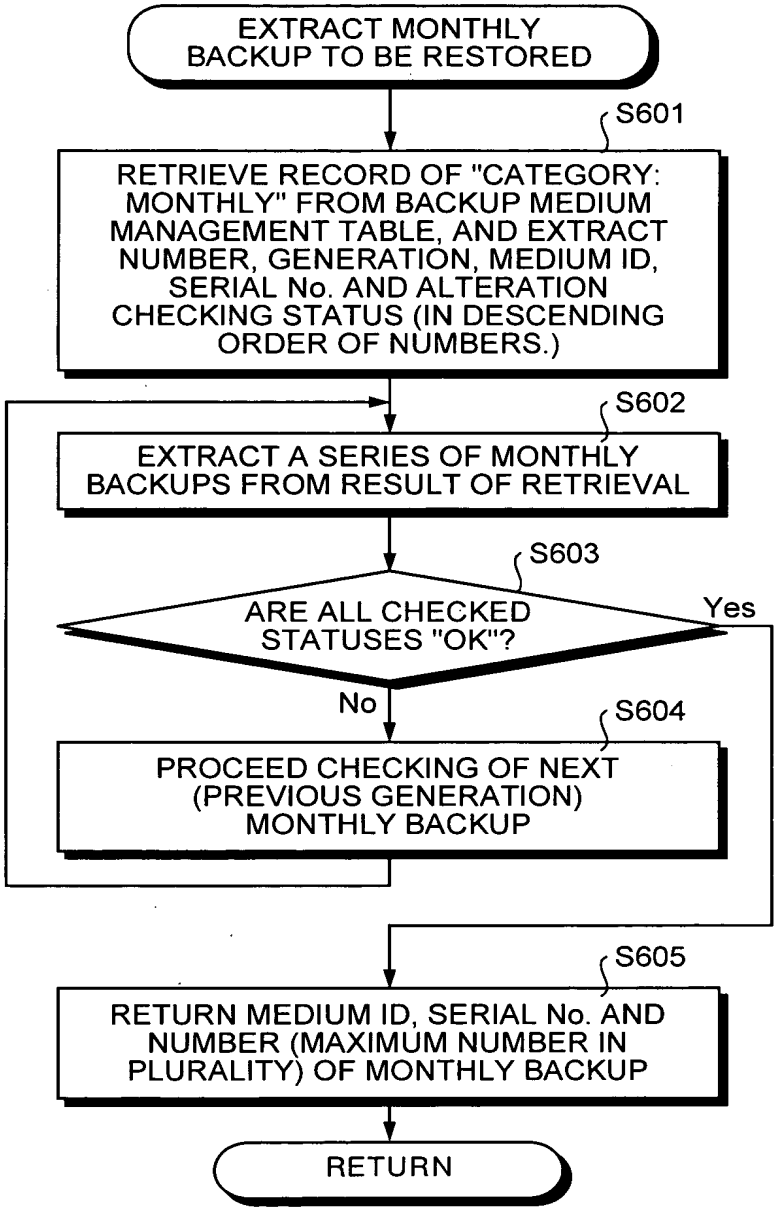

EXTRACT MONTHLY BACKUP TO BE RESTORED
S601
RETRIEVE RECORD OF "CATEGORY: MONTHLY" FROM BACKUP MEDIUM MANAGEMENT TABLE, AND EXTRACT NUMBER, GENERATION, MEDIUM ID, SERIAL No. AND ALTERATION CHECKING STATUS (IN DESCENDING ORDER OF NUMBERS.)
S602
EXTRACT A SERIES OF MONTHLY BACKUPS FROM RESULT OF RETRIEVAL
S603
ARE ALL CHECKED STATUSES "OK"?
Yes
No
S604
PROCEED CHECKING OF NEXT (PREVIOUS GENERATION) MONTHLY BACKUP
S605
RETURN MEDIUM ID, SERIAL No. AND NUMBER (MAXIMUM NUMBER IN PLURALITY) OF MONTHLY BACKUP
RETURN

FIG.7

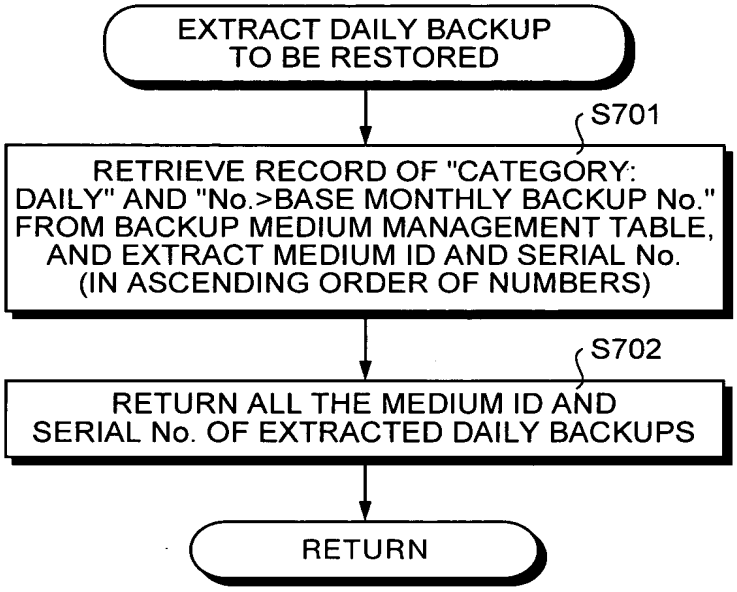
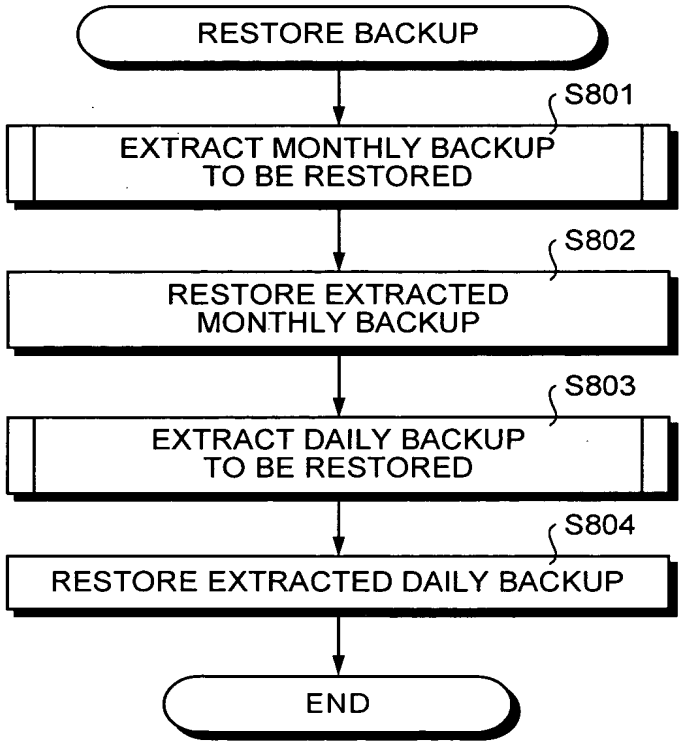

EXTRACT DAILY BACKUP TO BE RESTORED
S701
RETRIEVE RECORD OF "CATEGORY: DAILY" AND "No.>BASE MONTHLY BACKUP No." FROM BACKUP MEDIUM MANAGEMENT TABLE, AND EXTRACT MEDIUM ID AND SERIAL No. (IN ASCENDING ORDER OF NUMBERS)
S702
RETURN ALL THE MEDIUM ID AND SERIAL No. OF EXTRACTED DAILY BACKUPS
RETURN

FIG.8


RESTORE BACKUP
S801
EXTRACT MONTHLY BACKUP TO BE RESTORED
S802
RESTORE EXTRACTED MONTHLY BACKUP
S803
EXTRACT DAILY BACKUP TO BE RESTORED
S804
RESTORE EXTRACTED DAILY BACKUP
END